

## Some new oaks from Western Texas

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During the summers of 1931, 1932, and 1933 the author made a study of the vegetation of the Chisos Mountains of Western Texas. Certain inconsistencies in the identification of the oaks collected and those already in the herbarium of the University of Texas suggested a need for further study of that group. While making a special collection for this purpose the author came upon material which confirmed earlier suspicions of one or more undescribed species.

Both species herein described have been referred to *Quercus texana* var. *chisosensis* Sarg., and it was not until a collection of mature fruits was made that the several other smaller differences could be recognized as critical. It has been found that the material collected not only does not agree with Sargent's description of *Quercus texana* var. *chisosensis* but also differs from the typical examples of that variety found growing abundantly over the mountains.

✓ ***Quercus robusta*** Mueller, sp. nov. Ramuli graciles dense breviterque stellato-pubescentes aut demum glabrati; gemmae 1.5 mm. crassae 3-4 mm. longae ex oblongis acute ovoideae; folia decidua coriacea, auctumno non rubescentia, late lanceolata del acute ovatae, basi rotundata, late cuneata, truncata, vel leviter cordata, 2.5-5 cm. lata, 6-11 cm. longa, dentibus 8-10 setaceis, pubescentia pilis fasciculatis utrinque persistentibus; petioli 0.5-1 mm. lati, 10-20 mm. longi, stellato-pubescentes; fructus annuus solitarius breviter pedunculatus; cupula parva; glans oblonga fere cylindrica, apice rotundata, 8-10 mm. crassa, 17-22 mm. longa, puberula, ad partem circa tertiam inclusa.

*Quercus robusta* differs from *Quercus texana* var. *chisosensis* chiefly in its almost cylindrical fruit, the stiff, heavier branchlets, and the stiff, coriaceous, pubescent leaves which do not turn red in autumn. Apparently its alliance is with typical *Quercus texana* Buckl.

( ***Quercus robusta*** Mueller, sp. nov. Twigs somewhat slender (2 to 3 or rarely only 1.5 mm.), obscurely fluted, densely short stellate hairy the first year or late glabrate, dark red-brown be-

coming grey in the second year, numerous small lenticels (evident when not covered with pubescence); buds 1.5 x 3 to 4 mm., oblong to acutely ovoid, glossy brown, the scales ciliate; leaves deciduous, stiff, coriaceous, dull green, not becoming crimson in autumn, broadly lanceolate to acutely ovate, often long attenuate (by the elongation of the terminal lobe), rounded at the base, frequently broadly cuneate, truncate, or even shallowly cordate, setaceously 8-toothed, the terminal pair often so reduced as to become a part of the terminal lobe, with deep rounded sinuses, usually unequally lobed, moderate in size (2.5 to 5 x 6 to 11 cm.), fascicled hairs persistent especially above and along the midrib beneath, frequently one or two denser axillary tufts beneath; veins branching but hardly looped, scarcely raised above but prominent beneath, usually alternately passing into the lobes; petiole slender (0.5 to 1 x 10 to 20 mm.), stiff, stellate hairy or finally glabrate, dark red at the base shading into straw color above, dorsally flattened; catkins ?; fruit biennial, solitary, or, if paired, one usually not developing fully, the mature fruit borne on a short peduncle (2.5 x 5 or 6 mm.) or subsessile; cup small (about 12 mm. in diameter and 8 mm. in depth); scales thin, appressed, somewhat elongated and narrowly rounded at the apex, light brown, ciliate, and densely pubescent dorsally with silvery white hairs which are readily rubbed off; acorn oblong, almost cylindrical, broadly rounded at the apex, about 8 to 10 x 17 to 22 mm., finely dense pubescent, with longitudinal dark markings, one third or more included.

A large tree with low, wide spreading main branches, stiff young branches, and dark grey or black bark roughly furrowed, the trunk as large as 1 m. in diameter, the crown about 10 to 12 m. high and about 15 m. broad.

The type (Mueller no. 567) was collected August 25, 1933 in very moist Oak Canyon in the Chisos Mountains at an altitude of about 4200 feet and is deposited in the herbarium of the University of Texas at Austin.

✓ ***Quercus graciliformis*** Mueller, sp. nov. Ramuli gracillimi mox glabrati; gemmae 1-1.5 mm. crassae 1.5-2 mm. longae ovoideae; folia decidua anguste lanceolata, 2.5 cm. lata, 8 cm. longa, basi cuneata, mox glabrata, rariter in axillis venarum subtus pilosa, dentibus 8-10 setaceis; petioli glabrati 0.5 mm.

crassi 15–20 mm. longi; fructus biennis solitarius vel geminatus subsessilis; cupula parva tenuissima; glans acute ovoidea puberula, 10 mm. crassa 18 mm. longa, tantum basi inclusa.

*Quercus graciliformis* exhibits definite alliance with the *Acutifoliae* of Northeastern Mexico. It differs from *Quercus Canbyi* Trel. in having biennial fruit with acorns enclosed only at the base and leaves with more numerous lobes. A part of the material referred to var. *parvilobata*, however, can be distinguished from *Quercus Canbyi* only by the fruit. *Quercus graciliformis* differs from *Quercus texana* var. *chisosensis*, to which it has been erroneously referred, in the characters of the section *Acutifoliae* to which it belongs.

***Quercus graciliformis* Mueller, sp. nov.** Twigs very slender (1.5 mm. or less), fluted, quickly glabrate, deep glossy red to brown, grey in the second year, few small buff lenticels hardly evident; buds small (1 x 1.5 to 1.5 x 2 mm.), ovoid glossy brown, the scales ciliate; leaves deciduous, narrowly lanceolate, long attenuate, cuneate at the base, setaceous 8 to 10-toothed with somewhat deep rounded sinuses (rarely very shallow), often unequally lobed, moderately small (2.5 x 8 or sometimes 3 x 8 or 2 x 10 cm.), soon glabrate, entirely smooth or very rarely an axillary tuft beneath, glossy green above, more dull beneath; veins fine, often branching but rarely looped, scarcely raised above, more prominent beneath, usually passing alternately into the teeth; petiole glabrous, deep red at the base shading into straw color, dorsally flattened, very slender (0.5 x 15 to 20 mm.), soft flexible; catkins ?; fruit biennial, solitary or sometimes paired, subsessile; cup small (scarcely 10 mm. in diameter), shallow about 3 mm. deep); scales thin, appressed, narrowly rounded at the apex, light brown, ciliate, white pubescent along the mid-dorsal area; acorn acutely ovoid, about 10 x 18 mm. at maturity, finely dense pubescent, with longitudinal dark markings, enclosed only at the base.

A small tree 6 to 8 m. high with long, slender, flexible branches and grey, furrowed bark, the trunk rarely over 0.3 m. in diameter.

The type (Mueller no. 565) was collected August 25, 1933 in Blue Creek Canyon in the Chisos Mountains at an altitude of about 5500 feet and is deposited in the herbarium of the University of Texas at Austin.

With more persistent pubescence, shorter and reduced number of teeth, shallower sinuses, rounded leaf bases, shorter petioles (about 10 mm.), smaller leaves (about 1.5 x 5 cm.) with margins 1 to 8-toothed, entire or merely crisped, this becomes var. *parvilobata*; (Mueller nos. 566a, 566b, and 566c collected August 25, 1933 in the type locality of the species). This is a very variable form, grading into the type in any or all of the characters by which it is differentiated.

Series of specimens designated as co-types of the above two species and variety are deposited in the following herbaria: Arnold Arboretum at Jamaica Plain, Mass.; University of Illinois at Urbana; Field Museum of Natural History at Chicago.

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